Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

OUR COAST DEFENCES.

BY GEORGE GRISWOLD HILL.

THE Army, the Navy and the Marine Corps have hitherto constituted the military establishment of the United States, and with the character and functions of these arms of the military service all intelligent Americans are familiar; but there is a new grand division of the national defences of which there is less general knowledge, and yet so rapidly has it developed that the last Congress, by an enactment which will take effect on July 1st, 1908, converted it into a distinct corps, separate in all but administrative organization from the mobile army. This is the Coast Defence Artillery, a purely defensive unit in the military establishment, characterized by its immobility and by the immensity of its responsibility as the defender of the great seaboard cities, and the protector of the shipping in the ample harbors which indent our 5,500 miles of coast line. On its efficiency depends not only the safety of the great financial centres along the coasts, with their millions of lives and billions of treasure, but the effectiveness of the navy, which, only when it is relieved of defence duty, can perform its natural function—aggressive service against an enemy's fleet.

Following the Civil War, at which time the coast defences of the United States were excelled by those of no civilized nation, this branch of the military establishment was seriously neglected; and it was not until the creation of the Endicott Board, in 1885, that any serious attempt was made to replace with modern guns the obsolete fortifications and the antiquated smooth-bore, muzzle-loading guns which had been installed in the sixties, and which the development of naval armament and ordnance had rendered worse than useless. But, while the Endicott Board prepared plans for the modernization and extension of this division of the national defence, Congress failed to appreciate the importance of its work; and it was not until war with Spain seemed inevitable and the fancied menace of an attack by a Spanish fleet, in 1898, threw the inhabitants of Boston, New York, Philadelphia and other Atlantic Coast cities into a state of mind bordering on panic, that the national legislature began in earnest to provide for the coasts and harbors of the United States anything approaching a modern and effective system of defences.

Annual appropriations for the fortification of the coasts and harbors, which had averaged about $1,250,000 up to 1896, jumped to $5,500,000 in 1897, to $18,250,000 in 1898, and to $10,800,000 in 1899; and, since then, they have never returned to the wholly inadequate figures of the years immediately preceding. With additional funds, expended under the judicious and far-seeing supervision of Elihu Root and William H. Taft, and with enlarged personnel, the coast defences have now been brought to a state of efficiency never before attained; while the refinement of scientific and mathematical precision and the highly specialized paraphernalia which characterize this service have rendered its intricate workings almost an enigma to the officer who has not made it his profession; and even its enlisted men partake more largely of the character of skilled artisans than any other class in the military organization, with the possible exception of the navy engineers. The men, trained by long practice in particular harbors and fortifications, no two of which are the same, can perform the most effective service in the surroundings with which they are familiar; and the necessity of the continuous presence of this force of "home defenders" has demonstrated to the satisfaction, not only of the military authorities, but of Congress, the impracticability of longer maintaining the Coast Defence Artillery as an integral part of the mobile army, whose chief function is mobilization and concentration at such point or points as are most susceptible of attack or most available for offensive tactics. In the Spanish War, the scene of activities was in Cuba, and thither the mobile army was hastened with all possible speed, while along the Cuban coast was concentrated the most powerful fleet of the navy—and this, despite the popular belief that a Spanish fleet menaced the Atlantic seaboard. But the duty of the Coast Defence Artillery, rendered more arduous and responsible by the absence of army and fleet, continued to be the manning of the seaboard fortifications and the development of the highest possible degree of effectiveness at home.

Out of the specialization of its active service and the contrasting character of its war-time duties, has grown the necessity of separating the Coast Defence Artillery from the mobile army; while its development in importance of function and in effectiveness points the way to its further organization as a wholly independent corps, receiving its orders directly from the Secretary of War or from the Secretary of the Navy, as may later be determined, dependent on the existing organization of the army, or navy, only for its ordnance and ammunition, and for the construction of the fortifications which it is to man.

Thus complete in its organization, when the alarm of war sounds through the nation, and infantry and cavalry and field-artillery are sent hurrying to the various points of concentration, the Coast Defence Artillery, a complete unit in itself, will merely man its great guns and fire-control stations, mine its harbors and polish its search-lights, and await the coming of the enemy at every important inlet on the coast.

There were no coast defences, properly speaking, when the Spanish War broke out. The forts consisted of handsome cut-stone structures, massive in appearance and formidable in their architectural outlines, whose stone walls and parapets, because of their splintering capacity, would have constituted under the fire of modern naval ordnance a greater menace to the men behind the breastworks than the shot and shell of the attacking fleet. Their armament consisted of smooth-bore, muzzle-loading guns, wholly ineffective against the armor of a modern battleship, or even a protected cruiser. To load them, each gun crew would be compelled to stand out in full view of the enemy for from three to four minutes, as it rammed home the charge and projectile, while the rapid-fire guns in the enemy's topmasts raked them with withering fire. A few of the old smooth-bore guns had been "converted" by the insertion of rifled inner tubes, but even these would have caused little anxiety to the foe.

But the plans of the Endicott and Taft Boards on Fortifications and the temporary liberality of Congress have changed all this. The old stone forts still stand, but merely as monuments of the past. Instead, there have been constructed great embankments of sand, lined with concrete, behind which are placed batteries consisting of two 12-inch breech-loading guns mounted on disappearing carriages, with which the gun is elevated above the ramparts at the moment of firing, and by its own recoil is forced back to its original position for reloading; thus is effected the protection of the entire gun crew, with the exception of a single "pointer," from the direct fire of the enemy. These are supplemented with mortar batteries, consisting of eight 12-inch mortars—usually mounted in pits, wholly out of sight of the enemy—which are fired in salvos, discharged at an angle of from 45 to 60 degrees, sending eight 1,000-pound high-explosive shells a distance of perhaps two miles into the air and dropping them with almost incredible accuracy on the decks of the enemy's fleet, where even the most modern battle-ship carries an armor of not more than six inches. As an additional menace to the invading fleet, there has been provided the submarine mine system, with which attack is made on the war-ship's bottom, where, too, the armor is wholly absent or incomparably more vulnerable than on the freeboard and turrets. These mines, which are exploded by contact, or by an electric spark flashed to their interior by the officer in command, when, in his judgment, a vessel has come within the proper range, contain vast quantities of high explosives, the deadly effect of which was well attested in the recent Russo-Japanese war. The details of the mines used by the Coast Defence Artillery are guarded from publicity, but that they are of the most effective character the nation may rest assured.

To protect the mine-fields and repel landing parties, the fortifications are equipped with 3-inch and 6-inch rapid-fire guns using respectively a 15-pound and a 106-pound projectile, which can do effective work at the rate of from 10 to 15 shots a minute. The 6-inch projectile will penetrate seven inches of Krupp armor at 3,500 yards. And, finally, the forts are, or soon will be, provided with powerful search-lights with which to sweep the harbor, and throw into a brilliant glare the ship or smaller vessel which attempts to creep up the channel under the cover of darkness or a protecting blanket of fog.

The 12-inch gun, mounted on a disappearing carriage, is a high-power rifle, 42 feet long, capable of throwing a 1,000-pound projectile fifteen miles, although 12,000 yards is regarded as its effective range. At 9,000 yards this projectile will penetrate twelve inches of Krupp armor.

In the early nineties, accuracy of fire with coast-defence weapons was almost unknown, although about that time the first steps were taken to improve artillery gunnery. Even as recently as the Spanish War, all target practice was at fixed targets. Long and complicated calculations preceded every shot, the computations including the density of the atmosphere, as indicated by thermometric and barometric readings, the force of the wind and all the possible *minutiæ* of the ballistic problem. Much valuable time was required to make these calculations, and, as a result, the discharge of ten shots a day was regarded as good work.

Since 1900, the development of the system of fire-control, the invention of mechanical means of computation, and the refinement of the system of range-finding have resulted in such a remarkable increase of efficiency that the best-trained battery of to-day will place accurately sixteen times as many shots within a given time as the best-trained battery of six years ago.

The remarkable accuracy of fire attained by the Coast Artillery is due to the perfecting of a system of fire-control, employing complicated paraphernalia and a system of intricate and delicately adjusted mechanical computors. The brain of the system is in the fire-control station; its eyes are telescopes, usually located to the right and to the left, and 2,000 yards apart. Its circulatory system consists of electric wires whose ramifications lead to the various batteries, to the casemate from which are operated the submarine mines, and the mine-fields under the navigable channels. In the fire-control station are located the battle-commander, who controls all the defences bearing on a single channel; the fire-commander, who directs the fire of the several batteries and the search-lights; and the junior officers, who act as aides to these commanders. Each battery, in turn, has its own commander, who supervises its operation, while the mines are commanded by a mine-commander. The basis of the fire-control station is the plotting-board, which is a map of the harbor drawn on a scale of 300 yards to the inch and ruled to facilitate instantaneous calculations. Telephonic communication is maintained between the angle-measuring telescopes, the batteries, the casemates and the fire-control station. In a majority of fortifications, the range is determined by means of a 2,000-yard base-line, at each end of which is located an angle-computing telescope operated by a trained observer. The moment a vessel is sighted, it is located by both telescopes and the angles are telephoned to the fire-control station. These, when laid down on the plotting-board, show the exact location of the target and its range, or distance from the several batteries, its relative position to the mine-fields, etc. Beginning with the first sighting of the vessel, observations are taken every twenty seconds and immediately telephoned to the control station. Atmospheric and wind allowances are calculated there, allowance is made for the rate at which the target is moving, usually from 300 to 600 yards per minute, and the location of the vessel is communicated to the battery-commanders as each calculation is completed, so that each commander keeps his guns, or mortars, trained continuously on the approaching enemy, the only duty devolving upon the gun-pointer being the adjustment of his sight and elevation scales in accordance with the information telephoned from the control station. By this method, the gun, as fast as it can be loaded, is ready to be discharged at the word of command.

As a result of this system, numerous records of 100 per cent. of hits have been made at a moving target, at ranges varying from 6,000 to 7,000 yards, and at the rate of one shot per gun every 45 seconds. Even with the mortars, which, because of their necessarily high trajectories, were formerly supposed to be incapable of the most accurate work, some records of 100 per cent. of hits have been made at ranges varying from 5,000 to 9,600 yards, and 30 per cent. of hits has come to be regarded as a poor score. In a few fortifications, where the height of the observing station above the water-level will permit, a perpendicular base-line is used instead of the horizontal, but in other respects the operation of the system is substantially the same.

The highly specialized character of the service which has attained such astonishing results; the intricate machinery necessary to make these elaborate computations at twenty-second intervals; the extensive electrical paraphernalia essential to telephonic communication; the signalling; the explosion of submarine mines and the operation of the search-lights—have all operated to render the fortifications and equipment of the Coast Defence Artillery too complicated to permit of proper supervision and inspection by a departmental commander, usually a Brigadier-General of cavalry or infantry, sometimes of field-artillery. Together with the immobile character of this arm of the service, they have resulted in the necessity of so perfecting the Coast Defence organization as to make it completely independent of the mobile army. This will be accomplished by giving it its own adjutant, commissary and quartermaster departments, under the command of the Chief of Coast Defence Artillery, presumably a Major-General, whose immediate subordinates shall be Brigadier-Generals, each in command of one of the three coast-defence districts—which embrace, respectively, the North Atlantic, the South Atlantic, including the Gulf, and the Pacific coasts.

To man the elaborate coast defences already constructed and planned by the Endicott and Taft boards will require a force of 1,754 officers and 41,833 men. The authorized strength of the Coast Artillery is only 714 officers and 19,321 men; and there is no prospect that Congress will in the near future authorize any such increase in the standing army as will make available a sufficient number of officers and men to complete the number required for this arm of the service.

Moreover, the necessary manning detail does not represent, by any means, the whole force required for the successful operation and protection of the coast defences in time of war. The old-fashioned fortifications consisted of high-walled enclosures, often provided with moats, counterscarp, redoubts and glacis on the land side. The modern battery, while presenting an almost invulnerable front to the enemy afloat, is wholly unprotected in the rear; and the safety of the men and works must depend on the maintenance of an efficient rear-guard to repel attacks from landing parties which may have come ashore beyond the range of the big guns, or from an army of invasion. Infantry is best suited for this work; and, in the plans of the General Staff, infantry regiments are assigned to the maintenance of such rear-guards. But, despite the fact that the personnel of the coast artillery and the infantry forces of the regular army are wholly inadequate, and that there is little or no likelihood that Congress will supply the deficiency by an increase of the standing army, the situation is not as hopeless as it appears.

In 1902, Elihu Root, then Secretary of War, suggested a scheme for the augmentation of the coast artillery, which will go far to solve the problem. This scheme has received the hearty sanction of William H. Taft, the present Secretary of War, and under the able promotion of the Chief of Artillery, Brigadier-

General Arthur Murray, the proposition has been reduced to a working basis. As a part of the manœuvres of the past summer, a trial was conducted which demonstrated the entire feasibility of the project. Secretary Root thus propounded his plan:

> "One of the most valuable services which can be rendered to the country by its militia, and the one which can be made the easiest and most natural for it to render, is to supplement the regular force in manning the coast defences in time of war. . . . Manning the coast fortifications is constitutional militia work, for it is always to repel invasion. It can be undertaken by citizens living in the neighborhood of the fortifications with less disturbance and sacrifice than any other military duty, because it does not take them away from their homes and business. . . . An effort should be made to procure the organization of a National Guard force of heavy artillerymen in the neighborhood of each coast-defence fortification, with the understanding that, whenever the President finds occasion to call out the militia to repel invasion, that organization will be called into that fortification. In the mean time, an immediate and special relation should be established between the militia organization and the fortification for the purpose of practice and instruction. They should be made as familiar as possible with the use of the guns and the methods of defence at that particular point. In many cases, it will be practicable to give them facilities for meeting and keeping their equipment on the military reservation, which would make unnecessary any outside armory for their use. Such an organization could readily perform all its duties to the State, serving as infantry, but it could at the same time be distinctly known and constantly prepared for service as a militia reserve of the fortification with which it sustains the relations described.
>
> "Another very important function to be performed by militia, and having the same characteristics of not requiring militiamen to render any service except for the defence of their homes, is the service to be rendered by infantry in the defence of our coast fortifications against attack in reverse by land. That is a subject which ought to receive early and earnest attention on the part of the Federal Government. It is of great importance that an adequate force should be ready to perform that service, should be ready to take their places without confusion, and that there should be a perfect understanding as to where the force is to come from, where they are to be posted, and how they are to be supplied and maintained.
>
> "The National Guard contains two widely different elements: one is composed of men who wish to perform their duty to the State as members of the militia, but do not wish, or do not feel at liberty, to leave their families or their business interests and become soldiers for all purposes, liable to be sent away for distant military operations. The other element wishes to go wherever there is adventure and a chance to fight. The amount of strictly local militia-work of the highest

> **importance to be done in case of war is so great that the whole National Guard force, of the seacoast States, at all events, can be made just as useful as if they all became volunters for all purposes. In order to accomplish this, however, there should be careful prearrangement as to the distribution of duties."**

The suggestions so carefully thought out by Secretary Root have been cordially adopted, and under the authority of Secretary Taft and the immediate and capable direction of General Murray the details have been perfected with equal care. During the past summer, every coast State from Maine to Washington, with the exception of Delaware, Virginia and North Carolina, accepted the invitation of the War Department to assign portions of its militia to cooperate with the coast-defence artillery during the period devoted to the annual summer encampment. The force of militia invited in each instance equalled exactly the force of artillerymen manning a given fortification, and, in addition thereto, certain companies of militia were assigned to the work of the rear-guard. During the first part of the practice, each regular soldier within the fortifications worked under the observation of a designated militiaman, and during the latter part of the period each militiaman worked under the immediate supervision and tutorship of the regular soldier he had previously watched. Men with the advantage of high-school and college educations were assigned to the fire-control stations, the plotting-boards, range-finders, etc., for which quasi-scientific work their attainments especially qualified them. In all possible respects, the conditions of actual warfare were simulated. Day and night attacks by fleets composed of tugs, mine-planters and such other craft as the artillery officers could requisition were repelled by the carefully placed shots and skilfully judged mines operated by the militiamen, and remarkable adaptability and proficiency were demonstrated by the guardsmen, all of whom went back to their homes enthusiastic over the possibilities presented by the new departure. Massachusetts has already organized its coast-defence militia, and her example will doubtless soon be followed by other States. By this means, the force having been perfected, the menace of an attack on the shores of the United States would be promptly followed by a request from the President that each threatened State man the fortifications within its borders, and immediately the personnel of the coast defences would be doubled by the addition of men trained to handle the big guns, operate the mines and search-lights, and familiar with the surroundings, while the rear of each fortification would be guarded by men equally well drilled in that work. In addition to the patriotism which had led the guardsmen to perfect themselves in advance, they would be inspired by the necessity and desire to protect their homes, their families and property. All this would be accomplished in the twinkling of an eye; and, while the mobile army struggled with problems of commissary and transportation in the effort to mobilize itself into brigades at the designated points—while the General Staff wrestled with the problems of new departments and aggressive movements—the coast defences would be amply manned with experienced men.

It would, however, be misleading, in outlining the efficiency of the coast defences and the personnel of the corps, to omit all reference to the extraordinary short-sightedness exhibited by Congress in its failure to provide adequate means of defence for the most vulnerable inlet on the entire Atlantic coast, Chesapeake Bay. That no exaggeration of the danger which exists at this point may be suspected, it may be well to quote briefly from the report of the Taft Board on Fortifications, which says:

> "Commercially and strategically, Chesapeake Bay is to-day, as it always has been, of the very first importance. With the entrance, as it is now, unfortified, a hostile fleet, should it gain control of the sea, can establish, without coming under the fire of a single gun, a base on its shores, pass in and out at pleasure, have access to large quantities of valuable supplies of all kinds, and paralyze the great trunk railway lines crossing the head of the bay."

The uninitiated observer who visits the lower Chesapeake and Hampton Roads would naturally assume that the great disappearing guns at Fort Monroe and Fort Wool must command the entrance to the bay and prove a grave menace to an enemy's fleet; but the fact is that the entrance to the bay is eighteen miles from Fort Monroe; and, as has been stated by the Taft Board, there is no effective defence of the bay itself, while its extensive shores offer peculiar advantages for a naval base or landing operations. The approach to Baltimore is guarded by modern forts, and the Potomac approach to the national capital is equally well provided with fortifications. Norfolk and Newport News are protected by Fort Monroe and Fort Wool; but the damage which would result were a considerable armed force landed along the shores of the bay, the hardship which could be inflicted on the lesser cities, railways, etc., by a modern naval force, are almost incalculable, and the advantage of a base on the shore of the Chesapeake would almost double the effectiveness of a hostile navy against our own sea forces.

To remedy this situation, the Taft Board has earnestly recommended the construction of an artificial island in the 12-mile opening between Capes Charles and Henry, and the erection thereon of powerful fortifications which would command the entire channel from the Atlantic to Hampton Roads. A further detail of the project is the construction of a breakwater, which would not only protect the island from the ravages of the sea, but also afford a refuge for vessels seeking to escape the violent storms which occasionally sweep the vicinity of Cape Hatteras and the entrance to the Chesapeake. The Army Engineers have pronounced the project entirely feasible and already funds have been set apart for the construction of one 14-inch gun for the proposed fortifications. But for two years Congress has been urged to make the necessary provision for this essential link in the nation's coast defence, and with surprising improvidence has ignored the recommendation and permitted valuable time to elapse without action.

There are other points where the defences require strengthening. Long Island Sound is without adequate protection, and much remains to be done on the Pacific coast and in our insular possessions. The search-light equipment must be perfected at many forts, and at others additional electric-power plants are required. The completion of the separate administrative organization of the corps, a matter of paramount importance, is still unauthorized. Despite these defects, however, the nation's fortifications, compared with those of other countries, are highly creditable and the personnel of the corps, the high state of efficiency displayed by the rank and file and the notable ability of its officers and commanders must prove the occasion of pride to every American, as well as a source of security and comfort to all whose interests might be directly menaced by a hostile navy, especially during the temporary absence of the naval fleet.

GEORGE GRISWOLD HILL.